# SUNLAMP

## SALES MANUAL

# GENERAL ELECTRIC
# SUNLAMP

MERCHANDISE DEPARTMENT
GENERAL ELECTRIC COMPANY
BRIDGEPORT, CONN.

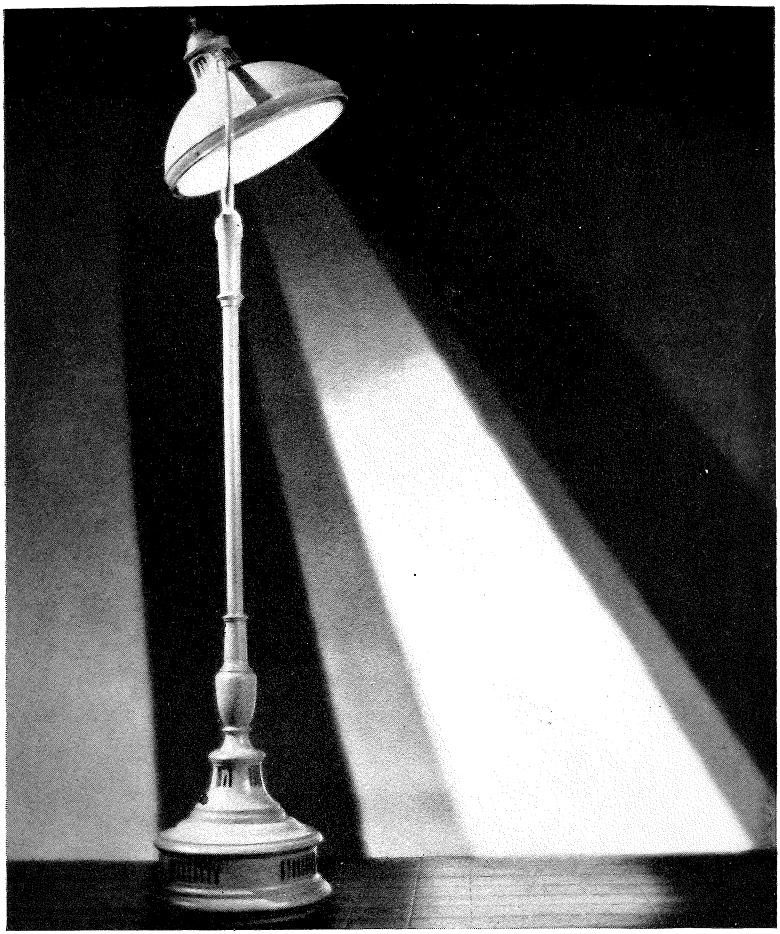
# INTRODUCTORY

BEFORE the salesman of General Electric Sunlamps can expect to do an effective selling job, he naturally must have a thorough understanding of sunshine and the product serving as a substitute therefor. This involves two cardinal points which follow:

1. He must understand not only what sunshine is, what sunshine does, but must, at the same time, be able to convey this information to others in such a way that a child can understand his presentation.

2. He must understand his product and be able, on demand of his prospect, to explain any mechanical feature of the General Electric Sunlamp.

   It is equally important that this explanation be couched in language so simple and convincing that he will not only compel the prospect's admiration for the G. E. Sunlamps, but will inspire confidence in the product as well. Remember that such a presentation will at the same time command respect for you.



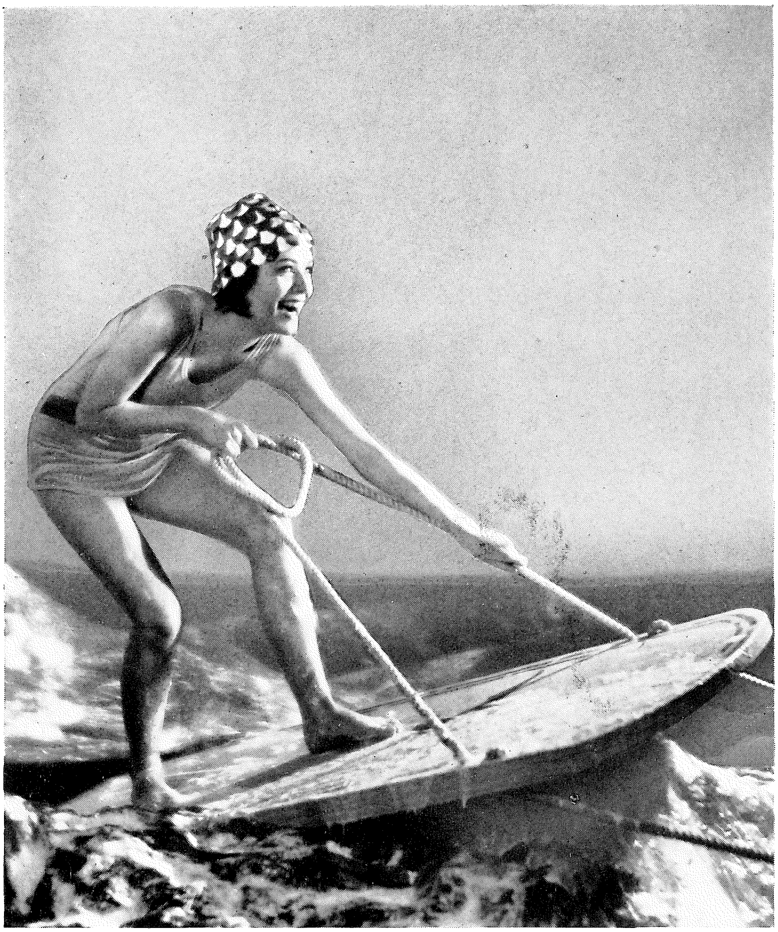
# The General Electric Sunlamp

The Sunlamp is made by the General Electric Company for those who believe that sunshine is healthful and who would like to have more of it.

The General Electric Sunlamp radiates those rays found in natural sunshine which authorities agree are an aid in maintaining vigorous health. It eliminates other powerful rays, not found in sunlight and which should be used only on a doctor's advice.

The General Electric Sunlamp is recommended for safe, easy and economical use in the home to be utilized as sunshine is utilized as an aid to health maintenance. Disease should be treated with the Sunlamp, when, and only when it is prescribed by a doctor.

On these grounds the General Electric Sunlamp is used and prescribed by physicians.



# When the Sun Shines—

Everyone instinctively realizes that sunshine is good, for with no sunshine at all the world would be without light and heat, and life on earth would be impossible.

And who doesn't agree that Summer sunshine adds tremendously to the joy of living?

Everyone knows that when the sun comes closer to us in the Summer time, the world becomes a more inviting and healthier place in which to live. In the Summer time all nature springs into life and beauty and coaxes us out of doors.

What parent hasn't noticed the change that comes over children when Summer brings them out of doors to romp and play in the sunshine. Their

# —Life Becomes a Joy

eyes take on a brighter sparkle, their color becomes ruddy, their spirits bubble over as the Summer sunshine bathes them.

What grownups, as a matter of fact, do not feel that call of out of doors in the Summer time and know that when they get out and play in the sunshine they look better, feel better and do better. Golf, tennis, bathing, boating, take people out in the sunshine and send them home filled with a greater joy of living. Without studying any statistics at all everyone feels instinctively that sunshine is good and healthful. And when you do study statistics you find that all through the Summer, disease grows less and the number of deaths per month steadily decrease. September, coming at the end of Summer, when human health has built itself up to a peak, is the month in which fewest deaths occur.

# Then Winter Comes

And when the sun begins to go away, the days grow colder and nights come earlier. The sun takes away some of its heat and we build fires to keep warm. The sun takes away some of its light and we replace it with our Mazda lamps. But the sun takes away something else which we have not been replacing. Invisible to the eye but a very potent part of Summer sunlight is ultra-violet radiation.

Many claims have been made about the miracles performed by ultra violet radiation. Some of these claims are based on fact and some have yet to be proved. Many doctors now use ultra-violet rays to treat their patients and whole books are devoted to the subject. No attempt will be made here to go deeply into the subject of ultra-violet radiation, we will only state four facts:

1. It is the ultra-violet radiation in summer sunshine which causes tanning.
2. Ultra-violet radiation produces Vitamin D in the human body, which is an aid to vigorous health.
3. Ultra-violet radiation will cure rickets, which is a disease of children that softens their bones.
4. There is only about four per cent as much ultra-violet radiation in winter sunshine as there is in midsummer sunshine.

It is very easy to understand why there is less ultra violet during the winter. The atmosphere around the earth and the smoke which man puts into the atmosphere acts as a filter which controls the amount of ultra violet that reaches the earth. This explains one reason why children playing in the sunshine in a smoky city do not get as great benefits from it as those playing in the clear air out in the country.

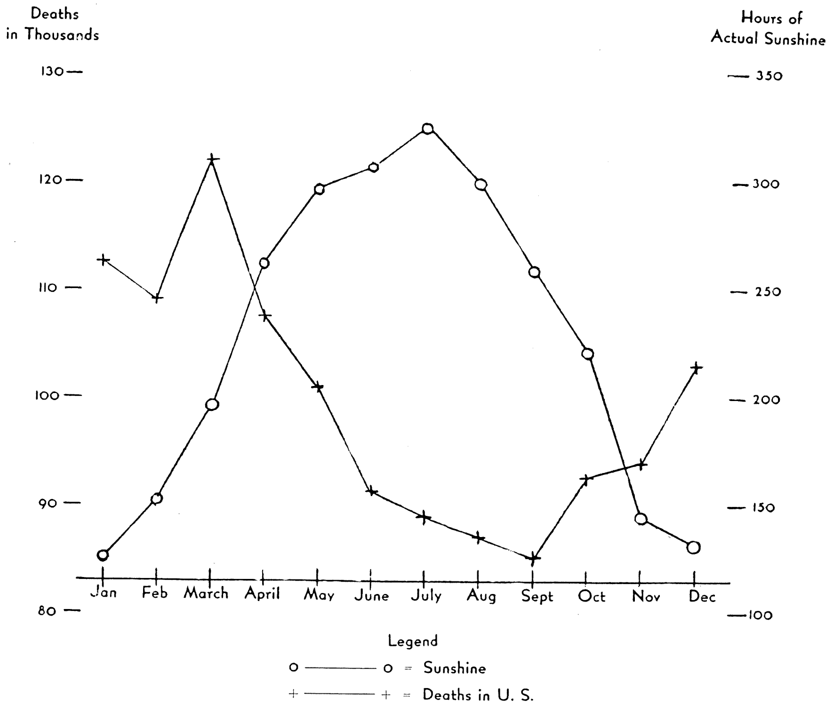
In the summer, when the sun is overhead we receive the greatest amount of ultra violet. But during the winter the sun is farther South and its rays must travel at an angle through a greater amount of atmosphere to reach us. This greater amount of atmosphere tremendously reduces the amount of ultra violet which reaches us. And when you take ultra violet out of sunshine you take away a very vital part of sunshine rays.

Even that small percentage of ultra violet which reaches the earth during the winter is denied to those that work indoors, live indoors and travel in glass windowed vehicles. For very little ultra violet can penetrate window glass.

Few indeed are the people who are as fit and vigorous as a long winter nears its end as they were when summer left. Little by little the stored up vitality of the nation is exhausted and steadily the death rate grows to reach its peak in March, as winter ends. By March every fibre in our body seems to call for sunshine.

Because we are healthier in summer than we are in winter, and because winter is due entirely to a lack of sunshine, we believe that the General Electric Sunlamp will find a welcome in many, many places and that it will prove a valuable aid to maintaining that health which is so essential to happiness.

# As the Sunshine Increases the U. S. Death Rate Begins to Drop



1. The above chart was produced from figures obtained from the U. S. Department of Commerce, Bureau of Census and the Department of Agriculture Weather Bureau.

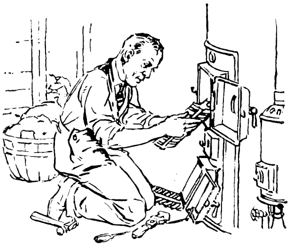
2. The mortality curve represents the average deaths by months of five years (1922 to 1926 inclusive) in the U. S.

3. The sunshine curve represents the average hours by months of actual sunshine over a number of years of cities located in various parts of the U. S.

4. NOTE: That shortly after the peak of sunshine in July the death rate reaches the lowest point (and vice versa).

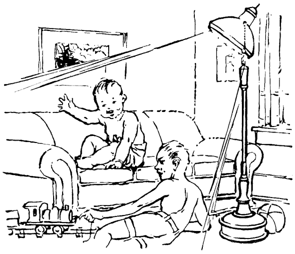
# When Winter Comes

## (In the Cleveland-New York Latitude)

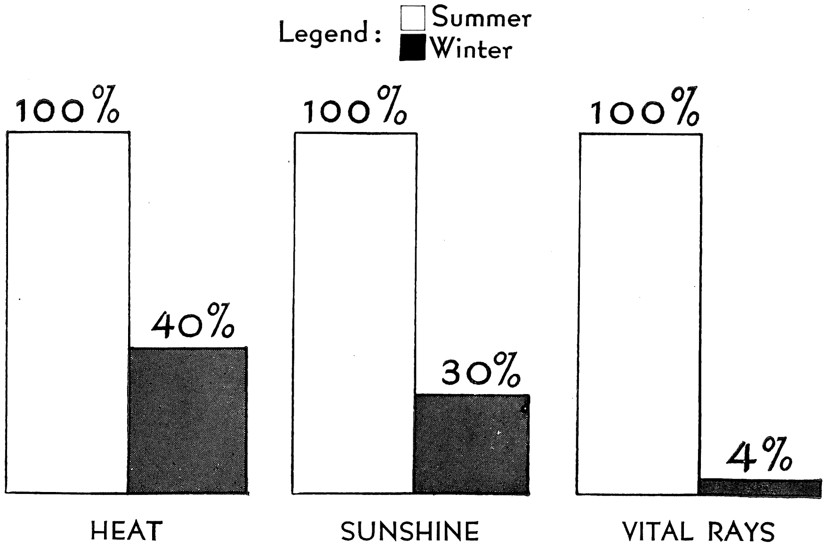


1. We get 60% less heat from the sun than in summer. To make up for this deficiency, we light the trusty furnace.

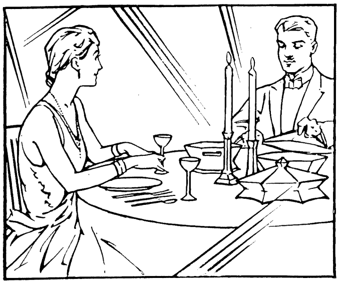
2. We get 70% less sunshine and 36% less daytime. To lengthen the short winter days, we switch on the home lights.



3. We get about 96% less of the ultra-violet rays—and nearly none at all in smoky cities. But what have we done about this greatest efficiency of all? To obtain their full share of ultra-violet, folks henceforth will switch on the General Electric Sunlamp.

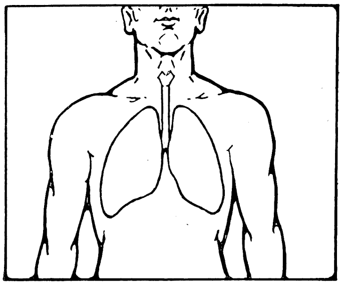


# The 4 Absolute Essentials to Human Existence



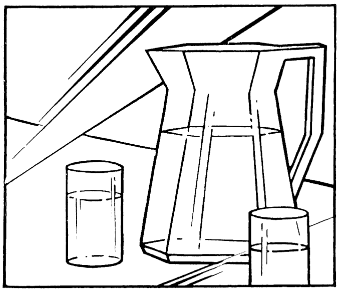
## Food—

Without it a man would die of starvation in less than 2 months.



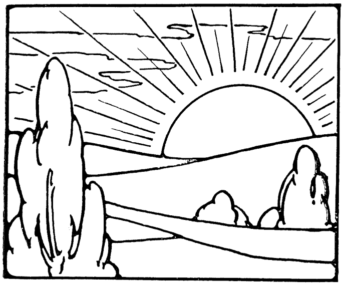
## Air—

Without air for his lungs a man would die in a few minutes.



## Water—

Without water a man would die of thirst in less than 6 weeks.

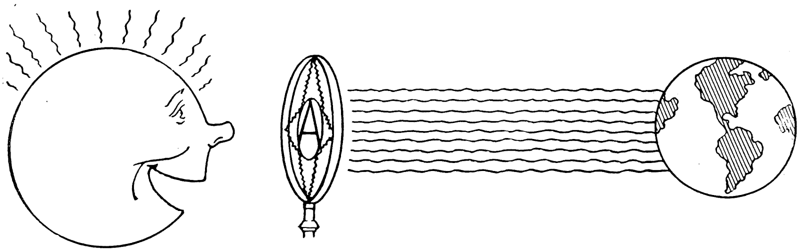


## Sunshine—

Without the sun — according to science, the beginning of all things earthly—plants, our source of food, would soon wither and die. With the source of our energy supply cut off, our local store of energy would soon be exhausted.

# STATION S-U-N

## The World's Biggest Broadcasting Station

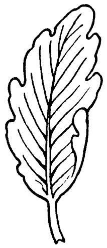


The Sun, although it is 93,000,000 miles away is our nearest star-station, broadcasting a continuous program of radiant energy.

It broadcasts this energy over a wide range of wavelengths and frequencies.

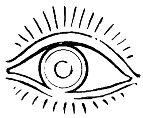
Traveling at the rate of 186,000 miles per second these waves reach the earth eight and one-third minutes after they leave the sun.

## TUNING IN ON THE SUN

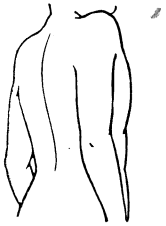


### Plants

1. The leaves of plants are the antennae and their tiny cells make up the receiving sets of plants.
2. When plant life tunes in, grass, trees, flowers and plants of every kind manufacture starch and—GROW.



### Animals



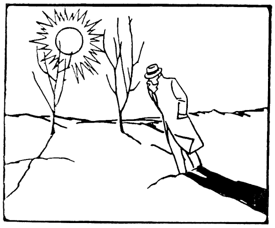
1. The eyes and skin are the receiving sets that tune in on the sun's program of radiant energy.
2. When the eyes tune in, animals and humans SEE.
3. When the skin tunes in, the animal and human being experiences a feeling of warmth. In addition to this, complex chemical changes are brought about that favorably effect GROWTH and HEALTH-MAINTENANCE.

# Natural Interference

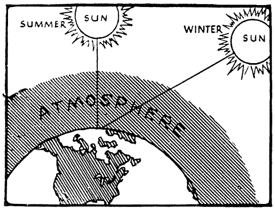
## Clouds, Moisture, Fogs

1. Dark storm clouds in winter and summer absorb light, heat and ultra-violet rays.
2. Fogs and moisture also mar the solar broadcast.
3. The 50 miles of earth's atmosphere absorbs a considerable amount of ultra-violet.

## The Winter Season



1. In our latitude the sun, as every school boy knows, does not rise as high in the sky nor shine as long on a winter day as it does in the summer.
2. The slanting rays of the winter sun must penetrate a much longer distance of earthly atmosphere than they do in the summer. This means that there is a thicker blanket, so to speak of dust, smoke and moisture for them to pass through.

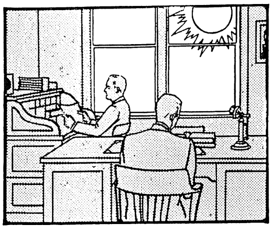


3. In this latitude only about 2% of the vital ultra-violet rays penetrate the atmosphere on the clearest winter day, whereas in the summer more than 90% of the vital ultra-violet rays come through.

# Artificial Interference That Mars the Sun's Broadcast

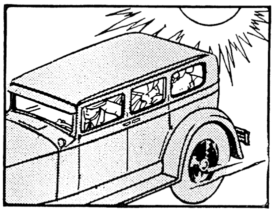
## Clothes

1. Sunshine is unable to penetrate the cocoon of clothes in which we hide.



## Indoor Work

1. Think of the hours our work keeps us confined indoors in the daytime.
2. While window glass lets a certain amount of light and heat rays through, it screens out the highly desirable vital ultra-violet.

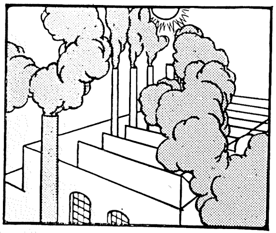


## Enclosed Autos

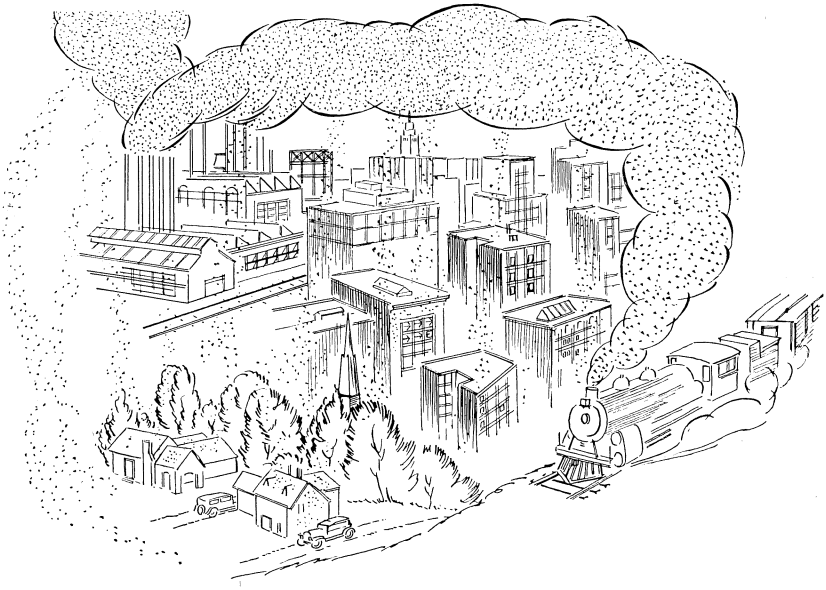
1. When we do venture outside we step into automobiles with metal and glass — an impenetrable armour to Sunshine's vital rays

## Soot, Smoke and Dust

1. Our manufacturing centers belch forth clouds of smoke which absorb a considerable amount of sunlight, heat and a large amount of the vital ultra-violet rays.



2. The commotion in our cities and air currents throw a vast amount of dust into the atmosphere. This also absorbs a goodly amount of the precious ultra-violet which the sun broadcasts earthward.



# A Typical City's Soot Fall*

## IF:

(a) 55,000 tons of soot deposit fall on 71 square miles of Cleveland per year, or

(b) 65 tons of this deposit fall on one square mile per month, or

(c) 1,400 tons of these particles fall on one square mile per month downtown.

## THINK:

(a) How much sunlight is screened out by the heavily polluted atmosphere.

## ALSO:

(a) Smoky atmosphere increases humidity and invites fog.

*NOTE—Results of a 24-month survey of soot fall in Cleveland at ten collection stations scattered throughout the city.

# Introducing the Gamut of Waves in the Huge Ocean of Radiant Energy

## Cosmic Rays —

The smallest ripples known and believed to come from stars beyond our universe.

## Gamma Rays —

Extremely short waves, but longer than cosmic rays, such as are emitted by radium. In wave length these waves range in the neighborhood of from near zero to .1 Ångström units.

## Röntgen Rays —

Also called X-rays, with wavelengths that may be taken arbitrarily as ranging from .1 to 500 Ångström units.

## Ultra-Violet Rays —

Those causing great chemical changes and varying in wavelength from one to 4000 Ångström units.

## Light Rays —

Those which enable us to see, and varying in wavelength from 4000 up to 7600 Ångström units.

## Infra-Red Rays —

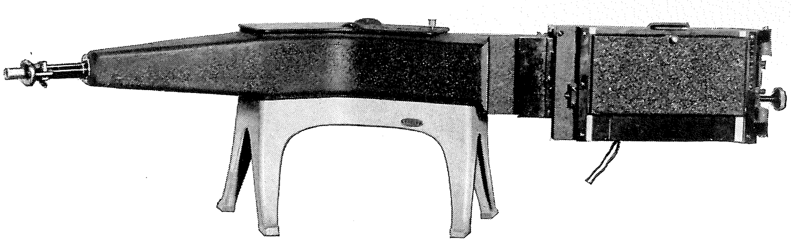
Those which are commonly considered as heat-producing and varying in wavelength from 7600 to 40,000 Ångström units.

## Radio Waves —

Those electro-magnetic waves for which radio sets are designed. To measure them in Ångström units would involve too long a string of ciphers. Hence they are measured in meters and are so marked on your radio dial.

# The Spectrograph

## It Divides, Measures and Photographs the Rays



The Spectrograph

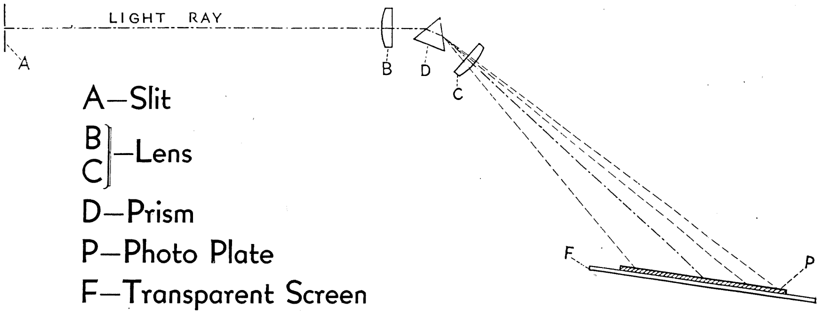


Diagram Showing How Spectrograph Separates the Rays.

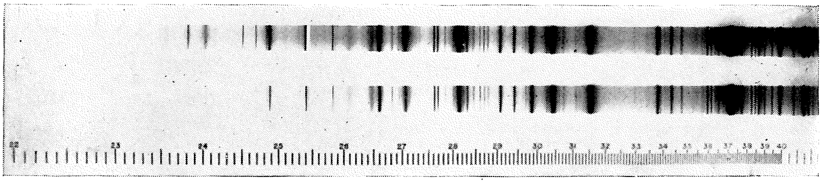
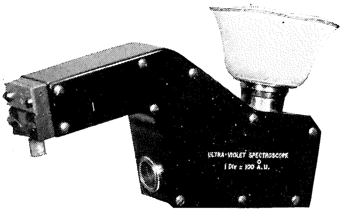


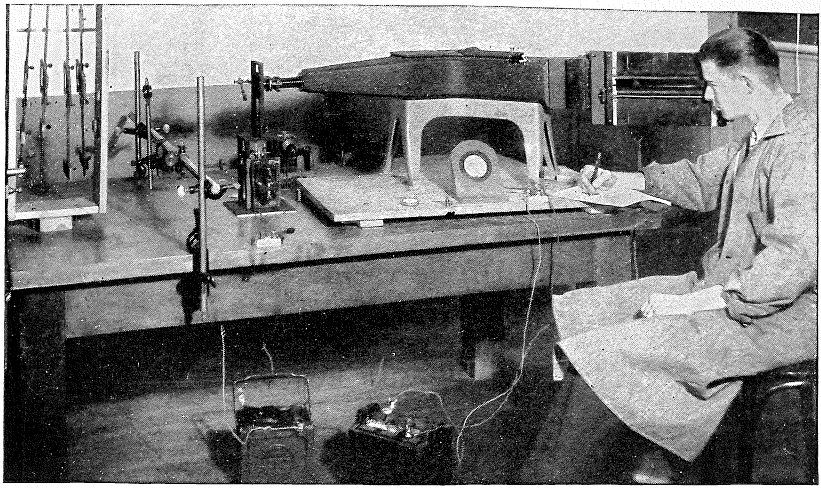
Photo of Two Rays.



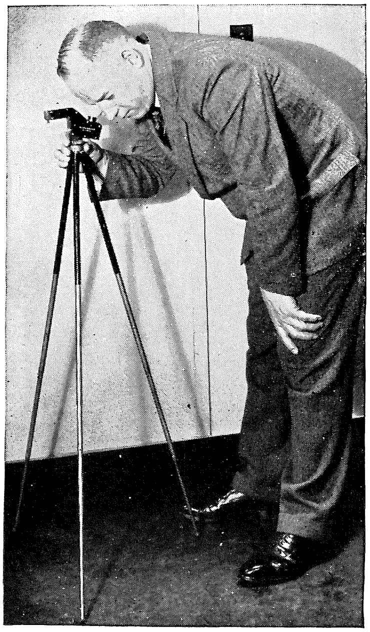
Spectroscope.

1. Science has developed and perfected two delicate instruments—the Spectroscope and Spectrograph.
2. Waves of radiant energy enter the slit at A and their direction controlled by lenses at B and C.
3. Prism D separates the waves.
4. In the Spectroscope the image or spectrum is thrown on a calibrated scale.
5. The Spectrograph is really a Spectroscope equipped with a camera which photos the resultant spectrum. When a special screen (F) is substituted for a photo plate (P) the spectrum of the visible and invisible rays is revealed to the naked eye.

# Science Tunes In



Here you see a scientist peering into a spectrograph analyzing the rays emitted by the heart of the G. E. Sunlamp.



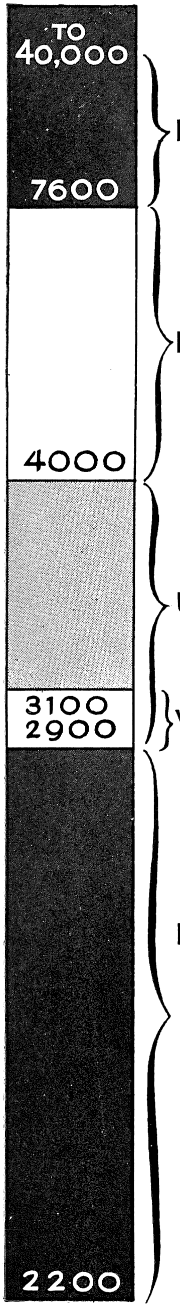
And here you see R. F. Strickland, who assisted in the development of the G. E. Sunlight (Type S-1) Lamp, looking through his spectroscope.

1. In 1666 Sir Isaac Newton with a common glass prism discovered the spectrum and that light consists of rays of varying wavelengths.

2. In recent years scientists have developed and perfected delicate instruments based on Newton's prism principle which led to the discovery of new and invisible rays of radiant energy. They not only measure wavelengths but relative intensities as well.

# Taking the Sun's Rays Apart

## By Wavelength in Ångström Units



Infra-Red, Heat-Giving (Invisible)

Light (Visible) Rays

Ultra-Violet in Summer Sunshine (Invisible)

Vital Ultra-Violet (Invisible)

Extremely Short Ultra-Violet

1. Screened out by atmosphere.
2. Can be produced artificially.
3. Of use in medical practice.

# Worthy of its Name

For many, many years the General Electric Company has been the world's greatest producer of electrical products. Through its MAZDA Research Laboratories it has developed the incandescent lamp to its present high degree of perfection. It has made arc lamps, ultra violet lamps and X-ray equipment for use by the medical profession.

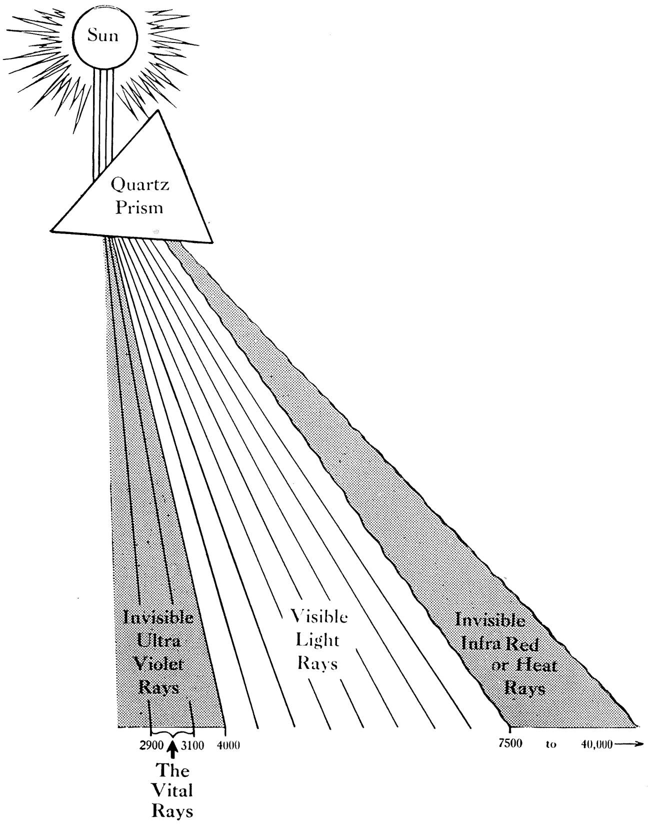
Because the public has found that each General Electric product was a good product and an honest value, it places faith in all things bearing the initials G. E.

Recognizing that this public faith in all General Electric products places a great confidence in any new product of the company, the General Electric Sunlamp was withheld from the market until it had proved beyond a doubt that it was worthy of its name.

The G. E. Sunlamp is now presented to the American public with these assurances:

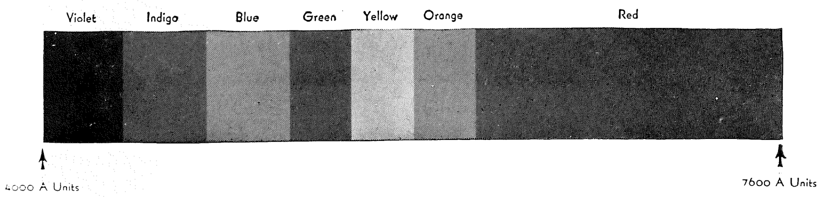
1. The G. E. Sunlamp radiates those waves which are found in Summer sunshine that are generally agreed to be an aid to the maintenance of health.
2. The G. E. Sunlamp is safe to operate in the home. It does not give off those very active ultra-violet radiations not found in sunshine which may be valuable in therapy but which should be used only under a doctor's direction.
3. The G. E. Sunlamp is as easy to operate as the Mazda lamps which light the nation's homes.

# Breaking Up Summer Sunshine Into Its Various Rays



1. Only a small part of all the known rays that make up radiant energy reach us directly when we expose ourselves to the sun.
2. The range of waves is wider in summer than in winter. That is to say, there is more ultra-violet rays in summer sunlight, as it reaches us, than in winter sunlight. In fact, they are negligible in quantity in the winter's sunshine.
3. On the brightest summer day at noon we receive:
    (a) The entire range of infra-red (invisible) rays.
    (b) The entire range of light rays (visible).
    (c) A small portion of the ultra-violet rays (invisible).
4. While the ultra-violet rays found in summer sunshine range from 2900 to 4000 Ångstrom units, only that small band from 2900 to 3100 units are known to be vital in the maintaining of health.

# Meet the Visible Spectrum



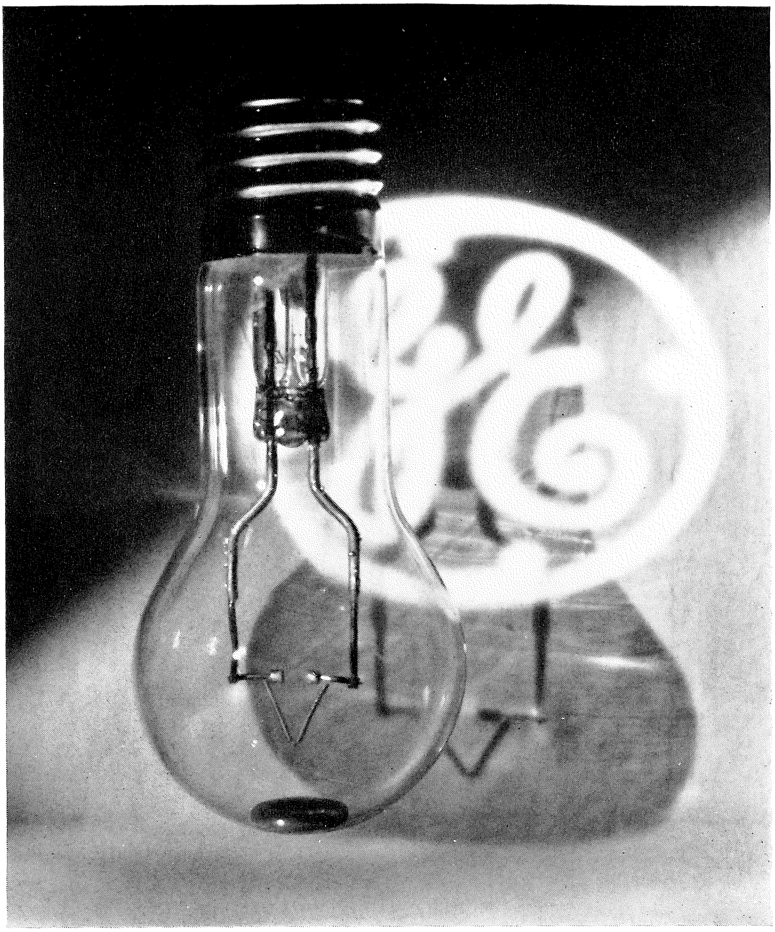
1. A spectrum is the image seen when radiant energy is separated and arranged in a series of rays in the order of their wave lengths.

2. The common rainbow is really a spectrum cast upon the sky when sunbeams (white light) passing through raindrops are separated into their various colors of violet, indigo, blue, green, yellow, orange and red.

3. Newton was the first man to "discover" the visible spectrum. He did this more than a century ago with a beam of sunlight and a common glass prism.

4. His epoch-making discovery illuminated, so to speak, the pathway of progress leading to the discovery of the entire spectrum of radiant energy. When the visible spectrum is about a foot long the entire spectrum of radiant energy — if it could be cast on either side — would be several million miles in length.

5. The rays that make up the visible spectrum are the only waves which our optical receiving sets — our eyes — are able to tune in on. And when our eyes receive them, we see. It is this range of waves that we call "light."



# The Heart of the G. E. Sunlamp

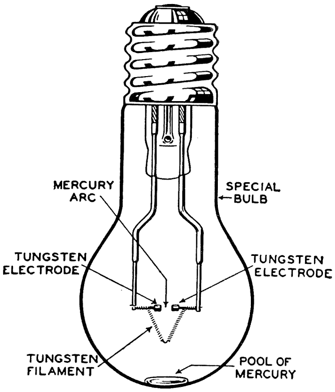
## The General Electric Type S-1 Sunlight Lamp

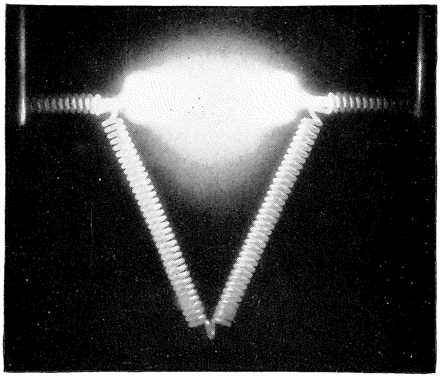
This is the heart of the G. E. Sunlamp, an entirely new development of the General Electric Company which gives radiation that closely approximates natural sunshine both in appearance and effect

When burning, it emits radiation from three sources: The tungsten filament, the mercury arc and the tungsten electrodes give off ultra-violet, infra-red and visible rays.

When the current is turned on the tungsten filament glows just as in a Mazda lamp. The heat from the filament vaporizes some of the mercury and this vapor enables the electricity to jump from one tungsten electrode to the other thus forming a mercury arc. The visible light is radiated from three;

Here is a diagram of the heart of the General Electric Sunlamp. The heat from the glowing tungsten filament vaporizes the mercury. The vaporized mercury causes an arc to form between the two tungsten electrodes.





The bulb of the lamp is made of a special glass which lets through ultra-violet rays which cannot penetrate ordinary glass but holds back rays that would come through a quartz bulb but which are not in the sunshine to which our bodies are accustomed.

sources approximately 7 per cent from the filament, 25 per cent from the arc and 68 per cent from the tungsten electrodes.

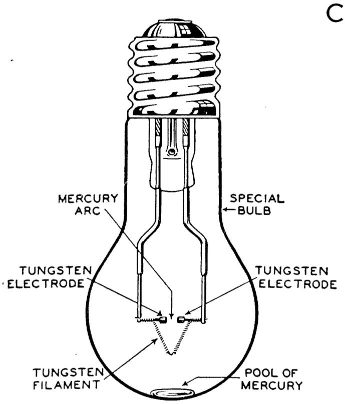
Thus it produces a visible light which resembles Summer sunshine in appearance and also gives infra-red and ultra-violet radiations which are invisible to the eye but vital in sunshine.

The bulb of this lamp is made of a special glass which plays an important part. This glass acts as a filter to the rays of the lamp just as the earth's atmosphere acts as a filter to the sun rays. The glass lets through the beneficial ultra-violet rays which come to us in sunshine but holds back these other ultra-violet rays to which our bodies are not accustomed and which we do not frequently encounter in nature.

In developing the Sunlight lamp the General Electric Company had to prime aims before it—to produce a lamp that was beneficial to use and to produce a lamp that was safe to use. These aims are now achieved and the Sunlamp may be used with that assurance.

# The Heart of the G. E. Sunlamp

## The Sunlight (Type S-1) Lamp



The G. E. Sunlight Type S-1 Lamp
(Overall Length—6.25 Inches)

### Consisting of:

1. A tungsten "V" filament.
2. Two tungsten electrodes.
3. Pool of mercury.
4. Special glass bulb.

### Working Like This:

1. The filament and two electrodes are the first to glow.
2. The heat generated vaporizes the mercury.
3. A mercury arc forms between the electrodes.
4. Three-fourths of the light is emitted by the electrodes (68%) and the filament (7%).
5. The arc emits 25% of the total light.

### The Special Glass Bulb:

1. Like the earth's atmosphere the type S-1 bulb transmits all the light, heat, and ultra-violet rays found in June sunshine.
2. Screens out the short, HARSH ultra-violet.

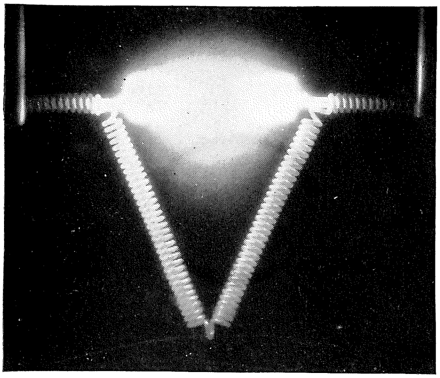
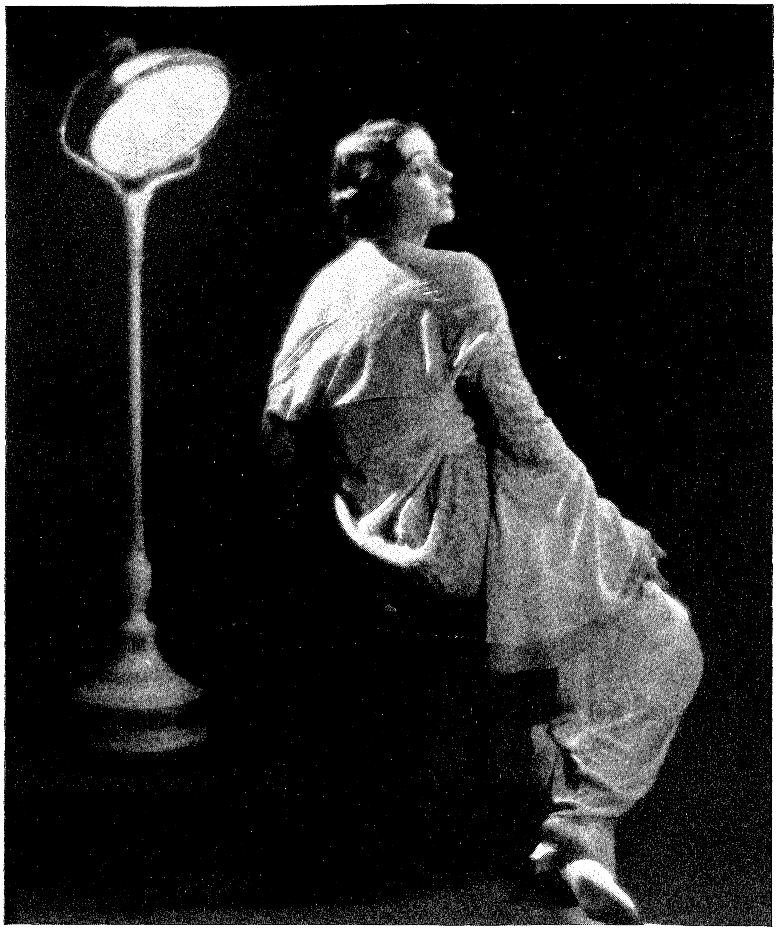


Photo of Type S-1 Energy Source as it looks through piece of smoked glass. Note incandescent filament and arc stream between the two brilliant electrodes.

### Different Than Window and Quartz Glass:

1. Window glass — or even a clear MAZDA lamp bulb — would absorb the desirable vital rays of wave-lengths between 2900 and 3100 Ångström units.
2. A quartz bulb would transmit not only the desirable ultra-violet but also a host of very short, harsh rays below 2600 A°.
3. The Type S-1 bulb, transmitting all the desirable rays and screening out the harsh ones, leaves the radiation of ideal sunshine — only.



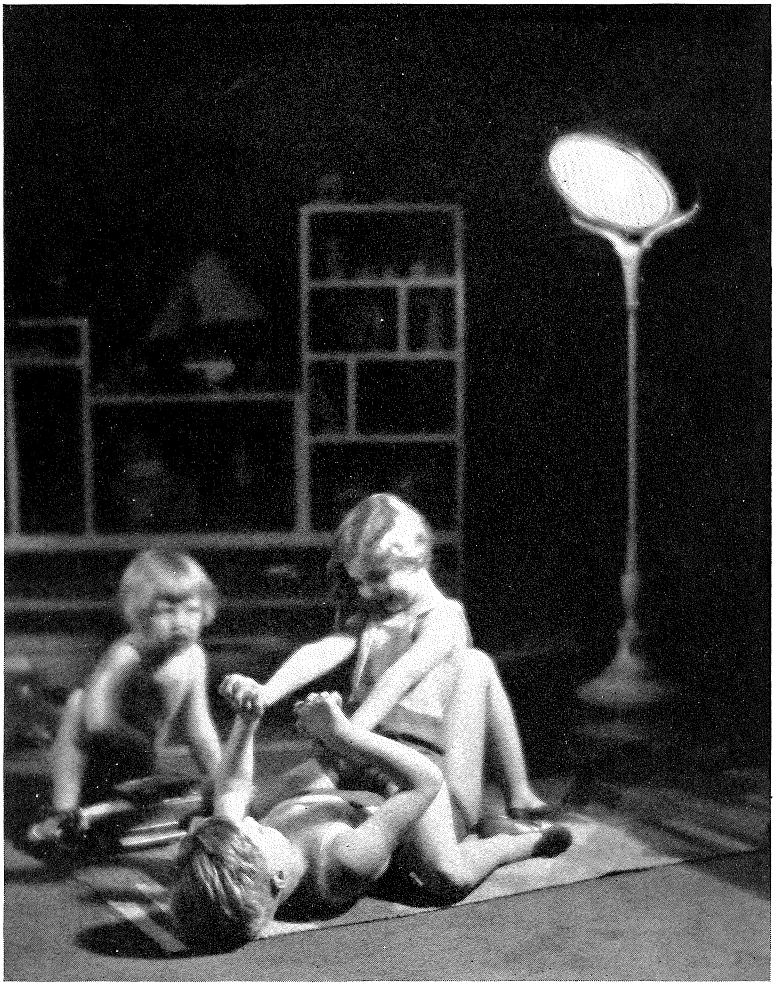
# Use of the Sunlamp

At a distance of 36 inches from the light source of the Sunlamp you will find that you will burn or tan at about the same rate of speed as you would in the mid-day sunshine of midsummer. Double the distance and your rate of tanning will be only one-fourth as fast.

All people do not tan or burn at the same rate of speed and also those parts of the body which are usually protected by clothes will be affected more quickly than the face and hands. Therefore, it is recommended that the first exposure be for five minutes at a distance of 30 inches from the Sunlamp. Accustom yourself to the light of the Sunlamp just as you do to the sunshine in midsummer. Lengthen the exposure to suit yourself as time goes on. Remember that when you expose yourself to sunshine, the sunburn you pick up does not fully show until several hours after the exposure.

# Tanning Not Necessary

It is not necessary to burn or tan to receive the benefits of the light from the Sunlamp. Everybody benefits from sunshine in the summer time and each individual may choose whether he or she wants to have a seashore and golf course complexion or not. If you don't want to tan or burn move further away from the lamp and you will be taking the health giving radiations more gradually. Tanning or burning in themselves are not an indication of health, but we associate them with health because they have come only from sunshine which does aid health.



# No Need for Goggles

Because the G. E. Sunlamp gives off those rays which are found in natural sunshine and because it does not give off those very short and powerful ultra-violet rays which are used in therapeutic lamps, there is no more need to wear goggles when using it than there is when you use summer sunshine. Naturally you would not look into the sun and you should not keep your eyes turned toward the lighted bulb in the G. E. Sunlamp. If you are reading by the light of the Sunlamp place it and your paper in such a position as to avoid glare, just as you would when reading in bright summer sunshine.

# When and Where to Use the G. E. Sunlamp

A convenient time and place will be found for each member of the family to benefit by the healthful rays of the G. E. Sunlamp.

BEDTIME — Many will enjoy using it just before retiring for the night. In bed and at leisure you can relax comfortably to its healthful rays. The height of the standard brings the light source of radiation just 30 inches above the average bed. Thus if you lie directly under the lamp you will be getting approximately the same amount of ultra violet that you would receive in sunshine of a bright summer's day. If you want to take the radiation slower and for a longer time move a greater distance from the lamp.

Give the children a Sunlamp bath just before they are tucked in for the night and notice how it quiets them down and hastens them off to sleep.

But don't go to sleep under the Sunlamp unless there is someone else to turn it off. You know how you would burn if you slept all day on a bathing beach, and the same thing would happen if you slept all night under a Sunlamp. As an added measure of precaution against an all-over sunburn, limit the exposure to one-third of the body at one time.

It isn't necessary to expose the entire body to the Sunlamp to have the whole body benefit by it. Ultra-violet radiation applied to one wrist of a child has cured rickets in the other wrist. Exposure of any part of the body to the Sunlamp will prove healthful to all the body.

PLAY HOURS — Put a Sunlamp in the children's playroom and let them romp about under it. Playing on the floor and moving about, the tanning or burning power will not be more than a fourth as great as when exposure is given at a distance. Hours of fun will be healthful hours with a G. E. Sunlamp burning in the playroom.

MANY OPPORTUNITIES—Turn on the G. E. Sunlamp while you are dressing or during the rub down after a bath. Many men use it during their morning shave. There are any number of times a day that people will be doing things that hold them in one place. These moments may be enjoyably spent in the rays of the Sunlamp.

AT THE OFFICE—Many business men whose work confines them to a desk find that there is no more cheerful or beneficial way to start the morning's work than to have fifteen minutes of sunshine when they first arrive at the office. The Sunlamp looks well in the office and will supply the rays that are so often sorely missed.

SOMETIME EVERY DAY. There are dozens of ways to use the G. E. Sunlamp. No one will have any difficulty discovering a time and place to enjoy it. The greatest benefits will come to those who make it a habit to use the healthful, cheering rays sometime every day.

# Advantages Are Apparent

The advantages of the G. E. Sunlamp are at once apparent. It brings to you the beneficial features of natural sunshine and places them at your command in a most desirable form.

PLEASING IN APPEARANCE. In appearance the Sunlamp is a handsome floor lamp. Attractively finished in ivory, it is designed to fit into the home atmosphere in which it will be most often used.

EASY TO OPERATE. The Type S-1 Sunlight bulb screws into the socket

in the Sunlamp just as you screw a MAZDA lamp into one of your light sockets. Then plug the cord at the base of the Sunlamp into one of the electrical sockets and turn on the switch just as you would with any ordinary floor lamp. (110-125 Volt, 60 Cycle Alternating Current).

That's all there is to it—there are no adjustments to be made—no carbons to be replaced. There is no odor and noise. You operate the G. E. Sunlamp the way you operate your house lights.

The Sunlamp need not be kept in one part of the house, it may be moved from room to room and plugged into any socket at will.

ECONOMICAL TO OPERATE. The Sunlamp costs no more to operate than MAZDA lamps of equal intensity. It uses 400 watts of electricity, which means that in most places it costs only 3 cents an hour for current. Your local electrical company will be glad to tell exactly what it will cost to operate a Sunlamp in your home.

When the bulb eventually gives out after long hours of burning, you replace it with a Type S-1 General Electric Sunlight lamp just as you replace your house lamps when they burn out. With average use this replacement will NOT be needed for many months.

When you consider how much you would gladly pay to have an hour of sunshine anytime you wanted it, you will more fully appreciate the economy of the G. E. Sunlamp.

HIGH EFFICIENCY. After the Sunlamp has been burned for some time the bulb begins to blacken on the inside. This blackening which is a deposit from the filament and electrodes might be thought to cut down on the amount of ultra-violet emitted by the lamp. Actually the amount of ultra-violet radiation does not decrease and in some cases increases as the bulb grows blacker. This is because the black deposit on the bulb increases the heat inside the lamp and makes the arc produce more ultra-violet radiation than when the lamp is new. As a matter of fact ultra-violet rays will come through some types of glass so dark in color that no visible light can be seen through it.

# Summary

PURPOSE—The purpose of the General Electric Sunlamp is to approximate midsummer sunshine as an aid to maintaining health.

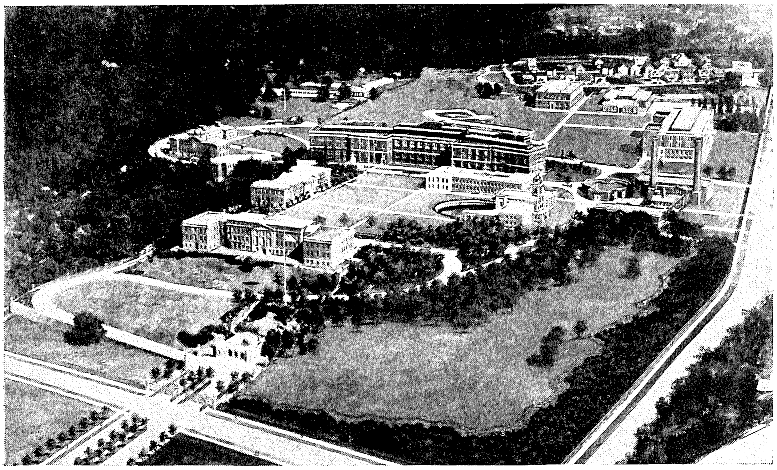
OPERATION—It operates on 110 to 125 volt, 60 cycle alternating current. It will not operate on direct current.

COST OF OPERATION—Three cents an hour is the average cost of current required to operate the Sunlamp.

RENEWAL—Only the General Electric Type S-1 lamp bulb should require replacement and this infrequently as is the case with Mazda lamps. Purchase new bulbs where you buy the G. E. Sunlamp.

PRICE — The G. E. Sunlamp sells for $69.50.

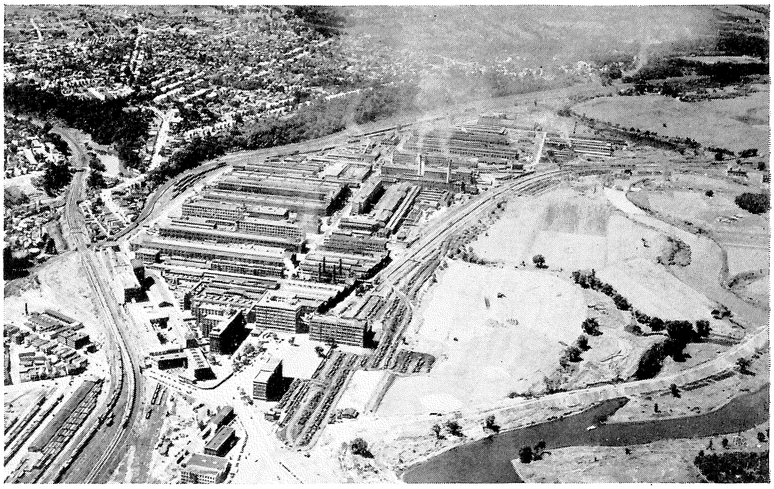
# Where the Heart of the G. E. Sunlamp Was Conceived and Developed



Nela Park, Cleveland—Where the Type S-1 Sunlight bulb, heart of the G. E. Sunlamp, was conceived and developed after years of exhaustive research.

The Lamp Development Laboratory Building at Nela Park—Where research on the Type S-1 Sunlight Lamp was conducted.

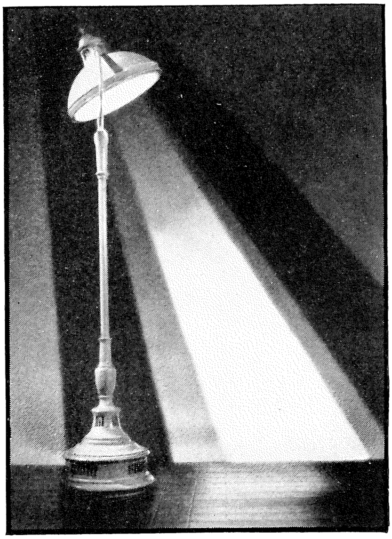
# Where the General Electric Sunlamp Was Perfected and Is Assembled



Schenectady Works—Where the G. E. Sunlamp was perfected through the joint efforts of the same group of scientists and engineers that developed and perfected the MAZDA lamp.

Bridgeport (Conn.) Works of the General Electric Company—Where the entire unit—Type S-1 lamp, reflector, transformer, etc.—is assembled by electrical experts.

# INSTRUCTION MANUAL



# GENERAL ELECTRIC SUNLAMP

MERCHANDISE DEPARTMENT
GENERAL ELECTRIC COMPANY
BRIDGEPORT, CONN.

S-532-A

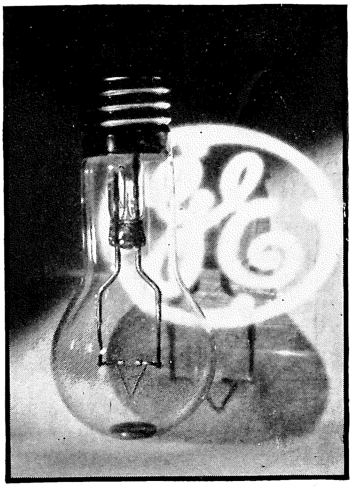
Under summer sunshine young bodies grow strong and beautiful. When nature no longer provides the youngsters with the vital rays of sunshine, the G. E. Sunlamp makes good the deficiency regardless of weather conditions.

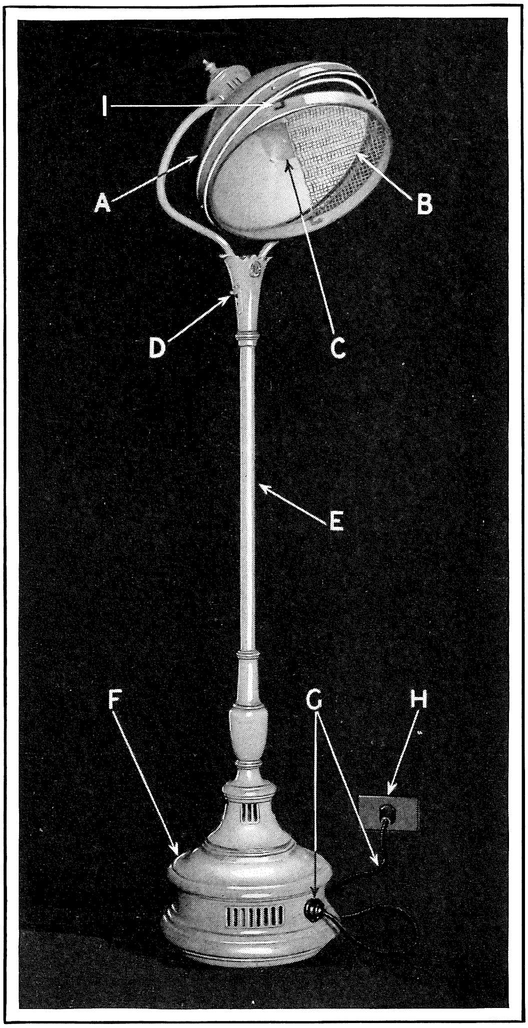
# Important!

The operating characteristics of the bulb in the G. E. Sunlamp are such as to require **60-cycle alternating electric current supplied at from 105 to 125 volts.** Therefore, the G. E. Sunlamp will operate satisfactorily in all but a very small percentage of American homes, as but few electric service companies supply their residence customers with other than 60-cycle alternating current. In the downtown sections of some cities, however, direct current is supplied even though alternating current is furnished in the residential and outlying districts.

It is easy to ascertain whether or not you are supplied with alternating current within the proper voltage range by asking your local electric light and power company.

Under no circumstances endeavor to operate the G. E. Sunlamp on direct current.





# THE G. E. SUNLAMP

A—Reflector
B—Protecting Screen
C—Type S-1 Lamp
D—Tumbler Switch
E—Sunlamp Standard
F—Base Containing the Transformer
G—Extension Cord
H—Wall Outlet

The average cost of electricity for operating the G. E. Sunlamp is only about three cents an hour.

# A Word of Welcome

You are now the owner of a General Electric Sunlamp. The Sunlamp will go a long way toward preserving that grand and glorious feeling which summer sunshine engenders and toward extending it throughout the entire year. May your new summer — from August to June — be as healthful as summer itself. And may your every day be filled with sunshine.

Years of exhaustive research by General Electric scientists and engineers have been put into the development of the G. E. Sunlamp — this, in order to give you the most effective substitute for summer sunshine at the least cost.

# Co-operation

Even so, this lamp cannot give its fullest satisfaction without intelligent and rational application on the part of the user. Therefore, before using the G. E. Sunlamp it is paramount that you read every word of this instruction manual.

In addition to a concise description and explanation of the chief parts embodied in the G. E. Sunlamp this booklet contains further information which should prove helpful in the proper use of the lamp. Follow all directions carefully.

# To Unpack and Assemble

Take the Sunlamp from its shipping case. Unscrew wing nuts, and remove wooden braces beneath reflector A (see page opposite). Detach protecting screen B from the opening (See I) of the reflector by first turning it about half an inch to the left and then pulling outward.

Now take the Sunlight Type S-I lamp out of its container and screw into the lamp socket (see C). Read warning notice on container.

Push protecting screen B into place over reflector and turn half an inch to the right so that the slots hold it fast. Be sure tumbler switch D is up at "off" position.

Now plug the textolite connector at one end of the extention cord into the outlet G at base of the standard, and the soft rubber plug at the other end of the cord into any wall outlet H supplying A. C. 60-cycle current at from 105 to 125 volts.

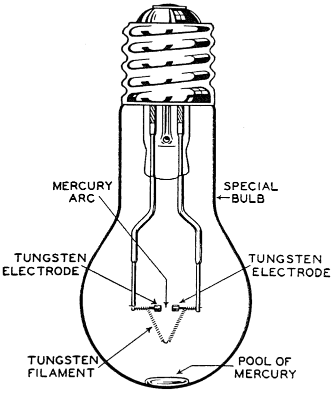
Do not destroy shipping case and bracing material.

# Heart of the G. E. Sunlamp

## The G. E. Sunlight (Type S-I) Lamp

Before turning on the G. E. Sunlamp to make sure it is operating correctly a word about the G. E. Sunlight Type S-I Lamp — for a general understanding of its construction and purpose — is advisable.

As pictured in the diagram (next page), note the V-shaped, coiled tungsten filament, the two tungsten electrodes, pool of mercury and special glass bulb. Later, when the lamp is turned on, the filament and electrodes should be the first to glow brightly. In almost the same instant the mercury should vaporize and an arc stream should flow in the gap between the electrodes. Not unlike the sun itself, a wide range of rays from the very long infra-red heat waves down to the very short ultra-violet rays dart forth from this energy source. When they strike the special glass bulb, only the desirable rays are permitted to pass through. The bulb, not unlike the earth's atmosphere, screens out all the very short, harsh ultra-violet rays.



SUNLIGHT (Type S-1) LAMP
Overall Length, 6¼ inches

# After Lighting the Lamp

You are now ready to turn on the G. E. Sunlamp. Snap the tumbler switch D down to the "on" position. As mentioned above, the filament, the electrodes and the mercury arc should combine to send forth a flood of cheerful and health-maintaining radiation. Do not look directly at the source.

## If Lamp Fails to Operate:

If either filament, electrodes, arc, or all do not "light", any of the following may be the cause.

(1) Voltage of your circuit too low. (2) Connected to direct current. (3) Mercury in neck of bulb. (4) Extension plugs making imperfect contact. (5) Type S-1 lamp not screwed tightly in reflector socket, or (6) Unit damaged in shipment or unpacking and rendered defective.

# Character of Radiation

## From the Type S-1 Lamp

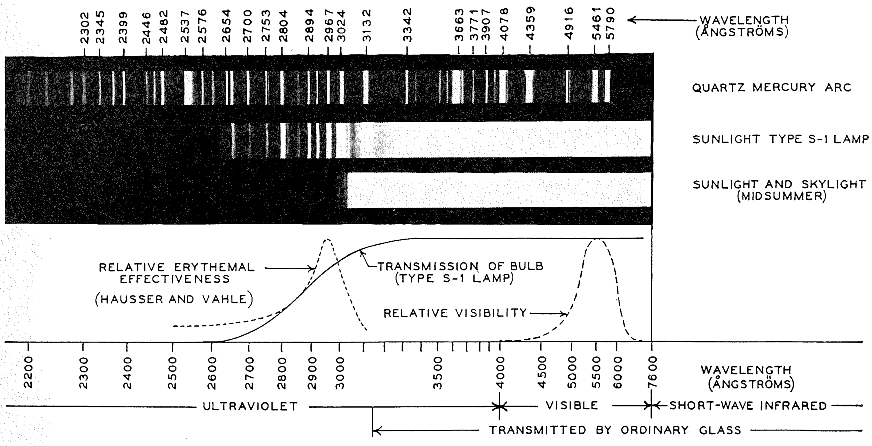
Before entering upon the subject of "how to use" the G. E. Sunlamp to best advantage, a word or so about the character of its radiation as compared with that from the quartz mercury arc lamp and that in sunshine itself is highly relevant at this point. A certain knowledge of the tool to be used obviously should enhance the skill of the user.

Shown below are three spectra—of a quartz mercury arc lamp, of the Type S-1 lamp, and of natural sunshine—photographed by delicate scientific instruments. A spectrum, incidentally, is the image seen when radiant energy is separated in a series of rays in the order of their wavelengths. Ångström units are used by science in measuring wave lengths.

Note that the Type S-1 lamp emits a wealth of the desirable erythema (sunburn) producing rays between 2900 and 3100A°. The short, harsh rays below 2800A° are not permitted to pass through the special bulb in appreciable quantity.

The short-wave limit of the best sunlight is approximately 2900A°. Inasmuch as special glass does not "cut off" radiatian abruptly, 2800A° was adopted as the practicable short-wave cut-off in order ta conserve the radiant energy between 2900A° and 3100A° which is known to be desirable. Owing to this lack of abruptness of the short-wave cut-off of the glass, a slight amount of radiation of somewhat shorter wavelengths is also transmitted. However, the radiation from Sunlight (Type S-1) lamps has been proved by adequate tests to be of such quantity and quality of ultra-violet energy that the eyes are safe without goggles under reasonable usage.

In order to produce an effective substitute for sunlight at reasonable intensities of illumination, relatively much more energy in the "2900" region has been provided than is present in sunlight. The Sunlight (Type S-1) lamp at present provides about 40 times more desirable ultra-violet energy



for the visible radiation than midsummer sunlight. In a proper reflector it produces the same degree of sunburn (erythema) at a distance of 36 inches in approximately the same time as mid-day midsummer sunlight outdoors.

# Directions On Use Of The General Electric Sunlamp

How to use the Sunlamp to the best advantage depends—just as it does with natural sunshine—on the user's particular make-up. No two persons are just alike. Some are blonds; others brunets. Some receive the benefits from ultra-violet more quickly than others. Even the skin of various parts of a particular person's body varies greatly in its sensitivity to sunshine, natural and man-made. Obviously, no one specific set of directions can be formulated to fit each Sunlamp user perfectly.

Thus your past experience with strong summer sunshine and a feeling-of-the-way with the G. E. Sunlamp should determine what your proper exposures should be. However, the following general directions should prove helpful:

Dust absorbs ultra-violet radiation, so it is well to dust off the Sunlamp bulb occasionally.

## In General

Exercise the same common sense and caution in using the Sunlamp as you would in the case of intense summer sunshine outdoors. One over-exposure may undo the good obtained from several short exposures previously taken. Therefore, feel your way. Also, avoid glare.

There is no more need to wear goggles when using the Sunlamp than there is when you use summer sunshine. Naturally you would not look into the sun and you should not keep your eyes turned toward the lighted bulb in the G. E. Sunlamp.

## Distance

At a distance of 36 inches from the light source of the Sunlamp you should obtain the same burning or tanning effects as you do from bright mid-day sunshine of midsummer. If you double the distance to 72 inches the intensity is but one-fourth as strong. Conversely, at half the distance, at 18 inches, the intensity is four times as strong as at 36 inches. Take your first exposure at about 30 inches.

## Duration of Exposure

At 30 inches your first exposure should not be for a longer time than 5 minutes. Wait a day. If no appreciable reddening (erythema) has occured, you may take a slightly longer exposure on day No. 2. Remember that reddening of the skin, if any, shows up several hours after the exposure. Lengthen subsequent exposures to suit yourself based, of course, on the results of previous exposures.

# "Sunburn" Not Necessary

It has not been proved that "sunburn" or tanning of the skin is necessary as an aid to the maintenance of health, but it is important to avoid severe and frequent reddening. The dangers of a single over-exposure are those of a severe sunburn with accompanying pain, lassitude and discomfort. Therefore, avoid "crowding" the process. Feel your way.

# Blonds and Brunets

Fair-skinned folk are more sensitive to ultra-violet rays than dark-complected people. Wherefore, if you are a blond, the exposures which proved successful in the case of a brunet will not necessarily be the best for you. Folks whose skin can manufacture dark pigment easily and who take a tan readily are better equipped to take longer exposures under the Sunlamp than very fair-skinned persons. This pigment acts as a shield or curtain against ultra-violet rays.

The following table shows the approximate length of time required under a G. E. Sunlamp operated on 115 volts to produce a good erythema (reddening of the skin) on an untanned portion of the body. By "good" is meant a considerable reddening of the skin without subsequent peeling. Longer exposures will be necessary to attain the same degree of erythema if the voltage supplied the Sunlamp is lower than 115. On the other hand, voltages higher than 115 will require shorter exposures.

## Minutes of Exposure at Various Distances From Light Source

| | 1½ Feet | 2½ Feet | 4 Feet | 5 Feet |
|---|---|---|---|---|
| Persons particularly sensitive to sunburn or tan. | 5 | 11 | 27 | 39 |
| Persons of average sensitivity to sunburn or tan | 9 | 20 | 49 | 71 |
| Persons of less than average sensitivity to sunburn or tan. | 15 | 33 | 81 | 117 |

# Area of Skin

When bathing under Sunlamp-shine at 30 inches limit the area exposed to not more than one-third of the body. If you wish to "sunbathe" the entire body—as when rubbing down after the showerbath or upon arising or retiring—a distance of about five feet is recommended.

# In Particular

MANY CONVENIENT USES—The G. E. Sunlamp may be enjoyed in a host of different ways by every member of the family. For example, let beneficient rays shine upon you either as you exercise, shave, dress, relax or read. It may be enjoyed by the kiddies at play in the nursery and by the man at the office the while he opens his morning mail. Fifteen minutes of sunshine is sure to start the day off on the right foot.

EXERCISE—While taking the daily dozen and subsequent rub-down, the suggested distance is about 5 feet from the Sunlamp. The time 15 to 20 minutes. Body area—from head to toe.

WHILE SHAVING—If the back is uncovered, place the Sunlamp not nearer than 30 inches away and limit the exposure to 5 to 10 minutes, depending on the results of previous exposures.

WHILE DRESSING—Since clothing intercepts the rays from the Sunlamp, since the hands and face are not so easily affected as the rest of the body, and since you are a moving instead of a still target for the rays—any convenient distance and length of exposure will do.

WHILE READING—Because the light from the Sunlamp is exceedingly bright at 30 inches and inasmuch as reading is more often a matter of hours than minutes—observe three precautions:

1. Make sure you are at least 5 feet from the light source.
2. Sit in such a position and place your paper at such an angle so as to avoid reflected glare.
3. Avoid over-exposure. A safe measure of precaution is to sit slightly beyond the main path of the light.

THE PLAYROOM—Hours of fun will be healthful hours with a G. E. Sunlamp in the playroom. With the kiddies romping around on the floor they are always at safe distances from the light source high above.

BEDTIME—The height of the G. E. Sunlamp is such that its light source is about 30 inches above the average bed. After you have accustomed yourself to the lamp's health-maintaining rays, a 15 minute exposure upon not more than one-third of your skin is suggested for him who prefers to take his sunshine while relaxing on his bed . . . But do not use the Sunlamp to put you to sleep unless you have arranged to have someone else turn off the Sunlamp for you.

AT THE OFFICE—Many business men whose work confines them to a desk find that there is no more cheerful or beneficial way to start the morning's work than to have fifteen minutes of sunshine when they first arrive at the office. The Sunlamp looks well in the office and will supply the rays that are so often sorely missed.

SOMETIME EVERY DAY—There are dozens of ways to use the G. E. Sunlamp. No one will have any difficulty discovering a time and place to enjoy it. The greatest benefits will come to those who make it a habit to use the healthful, cheering rays sometime every day.

# Renewals

Except for the Sunlight Type S-1 lamp, the G. E. Sunlamp has been made to last indefinitely. Only the Type S-1 bulb—like the MAZDA lamps in your home—will require, in time, replacement. Get a new one where you bought your Sunlamp.

RENEWALS—The Type S-1 bulb should last an average family a season. Obviously, the frequency of replacements will depend upon the amount of use to which the lamp is put. On the average, a "Type S-1" should last the family the better part of the year. Although the bulb becomes somewhat dark after many hours of use, countless tests have proved that the ultra-violet output is not decreased. What happens is this. A darkened lamp burns at a hotter temperature than a new, clear lamp. In so doing, it emits relatively more radiation than the bulb-blackening absorbs. When your "Type S-1" burns out, purchase a new one from the dealer who sold you the G. E. Sunlamp. For convenience, keep a spare bulb on hand.

# THE
# SPECTRUM OF RADIATION
## Emitted by
# SUNLIGHT (Type S-1) LAMPS

By

M. LUCKIESH

Director, Lighting Research Laboratory

Nela Park, Cleveland, Ohio

December 18, 1929

THE SUN or any other light-source sends forth electromagnetic energy of various wavelengths. The atoms are individual "sending-sets." Each emits its own characteristic wavelengths of energy, depending upon the atom's constitution and environment. The spectrum is the systematic separation of the various wavelengths. For convenience, the spectrum of electromagnetic energy is subdivided into regions such as infrared, visible and ultraviolet which are merely ranges of wavelengths.

One unit of wavelength is the Angström (A°) which is one ten-millionth of a millimeter — about four billionths of an inch.

The effect of radiant energy depends largely upon wavelength. The eye is a "receiving-set" responding to a range of wavelengths from about 4000A° to 7600A°. Photographic emulsions are "tuned" for other ranges. Rickets is prevented chiefly by ultraviolet radiation of wavelengths between 2800A° and 3100A° and the same radiant energy is chiefly responsible for sunburn or erythema. There are many "receiving-sets" tuned to different spectral ranges. Similarly, various materials are individualistic in their reflection or transmission of radiant energy. Therefore, the foundation of knowledge pertaining to the production, utilization and effects of radiant energy is an understanding of the spectrum.

The Sunlight (Type S-1) lamp consists of two primary sources of energy — incandescent tungsten and mercury vapor. The radiant energy of the former consists of a continuous spectrum of all wavelengths extending from long-wave infrared well into the ultraviolet. The mercury vapor emits energy only of certain wavelengths throughout the same spectral range and also of many wavelengths beyond the limit of the spectrum of sunlight or of the energy emitted by incandescent tungsten. Some of this short-wave ultraviolet energy is harmful to the eyes and its effects upon health have not been completely studied.

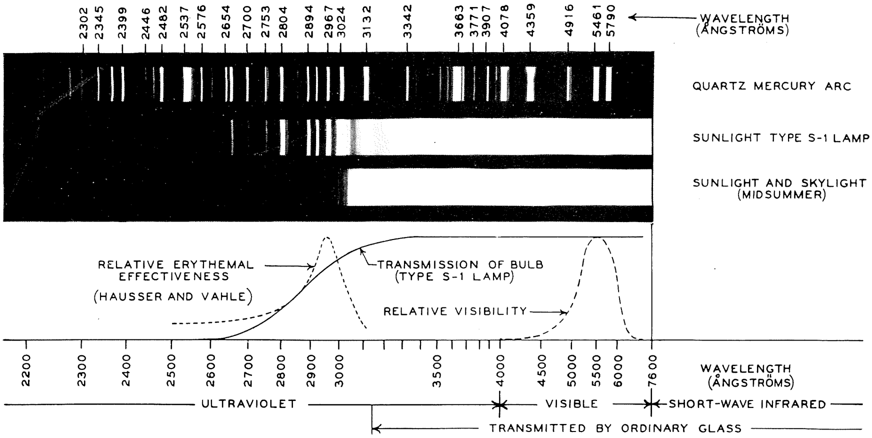
The Sunlight (Type S-1) lamp emits a quality of light generally acceptable as well as an adequate supply of health-maintaining ultraviolet radiation. The special glass bulb does not transmit the energy which is particularly harmful to the eyes. In other words, goggles (the bulb) are placed upon the source which obviates the necessity for goggles over the eyes if reasonable caution is exercised.

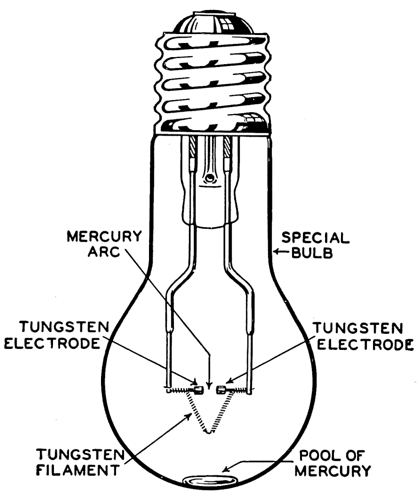
The Sunlight (Type S-1) lamp provides an effective substitute for midsummer sunlight as an aid to health. It is not practicable indoors to utilize intensities of illumination from an artificial source comparable with those of midday midsummer sunlight outdoors — 7000 to 9500 foot-candles. For this reason, an exact reproduction of the spectrum of sunlight by an artificial illuminant is impracticable as long as popular demand insists upon the same degree of effectiveness from low intensities of artificial sunlight indoors as from the very high intensities of midsummer sunlight outdoors. Therefore, an effective substitute for sunlight must have much more of the health-maintaining radiation per foot-candle than midsummer sunlight.

This result can be accomplished (1) by extending the short-wave limit further into the ultraviolet region than the short-wave limit of sunlight and (2) by providing relatively more ultraviolet radiation in the spectral region near the short-wave limit of the solar spectrum. In developing the Sunlight (Type S-1) lamp both these expedients have been utilized without sacrificing safety, provided the same degree of caution is exercised as in the case of midsummer sunlight.

The short-wave limit of the best sunlight is approximately 2900A°. Inasmuch as the spectral transmission of a filter of special glass does not end abruptly, 2800A° was adopted as the practicable short-wave cut-off in order to conserve the radiant energy between 2900A° and 3100A° which is known to be desirable. Owing to this lack of abruptness of the short-wave cut-off of the glass, a slight amount of radiation of somewhat shorter wavelengths is also transmitted. However, the radiation from Sunlight (Type S-1) lamps has been proved by adequate tests to be so limited in quantity and quality of ultraviolet energy that the eyes are safe without goggles under reasonable usage.

In order to produce an effective substitute for sunlight at reasonable intensities of illumination, relatively much more energy in this region has been provided than is present in the solar spectrum. By using these two expedients, the Sunlight (Type S-1) lamp at present provides about 40 times more *desirable* ultraviolet energy per foot-candle than midsummer sunlight. In a proper reflector it will produce the same degree of sunburn or erythema at a distance of three feet in approximately the same time as midday midsummer sunlight outdoors.





SUNLIGHT (Type S-1) LAMP

Overall Length — 6.25 Inches

Mrs Norman Miller
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